

**PURDUE**  
UNIVERSITY  
**FORT WAYNE**

**School of Polytechnic - College of Engineering and Computer Science**

**CPET 58100**

**Emerging Communications Technologies – Course Syllabus**

**Spring 2022**

**1/10/2022-5/8/2022**

**1. Course Information**

- **Course Title:** Emerging Communications Technologies
- **Credits:** 4
- **Prerequisite(s):** Foundations of communications (waived for graduate students)
- **Lecture Time and Location:** Online  
The students can watch the recorded videos, read handout and the posted slides.
- **Laboratory Time and Location:** Online Laboratory Sessions.
- **Course Description:** An introduction to principles and practice with the concepts of the recent or upcoming digital communication systems and technologies. Topics include review of digital communication systems sections such as modulators, multiplexing and ADCs; OFDM and MIMO; software defined and virtualization concepts; communication systems in Internet of Things; communication applications in connected cars; and digital communications in industrial applications.
- **Exams:** This course has no midterm or final exam.

**2. Instructor Information**

- **Name:** Hadi Alasti, PhD
- **Office Location:** ET 205 F
- **Phone Number:** (260) 481- 6423
- **EMAIL Address:** [alastih@pfw.edu](mailto:alastih@pfw.edu)
- **Webpage Address:** Use Brightspace
- **Office Hours:** <https://Purdue.WebEx.com/meet/halasti/>

Mondays: 01:00 pm – 02:30 pm

Tuesdays: 10:00 am – 11:30 am

Wednesdays: 01:00 pm – 02:30 pm

Thursdays: 10:00 am – 11:30 pm

Other times by appointment (send me e-mail, please)

An announcement will be sent out to all students if there would be changes in office hours.

## 2. Important Dates:

<http://www.pfw.edu/academics/calendar/>

## 3. Course Materials

- **Text Book:** No textbook. The lectures are prepared and presented based on references.
- **Software:** PFW will provide all software for on campus use. PFW provides a variety of free software for download including the Microsoft Office suite. Software can be accessed through MicrosoftImagine link upon request. Multisim & LabView will be used in this course.
- **Access to Laboratories and Other Materials:** The course laboratories can be used anytime the building is open and not in use by other courses. A schedule of lab occupancy hangs outside of each laboratory.
- **Optional Opportunity:** If you need access or electronic materials, you can come to PFW campus and see the Student Technicians in ET 217 and then Maurice Ralston in ET 330. If you have problems with computers or software, please see the Student Technicians in ET 217.

## 4. Course Assignments

- **Laboratory Assignments:** There will be some laboratory assignments throughout the semester (see course schedule). All laboratories, unless otherwise indicated, will be performed in a small group of 2-3 people. Each student is responsible for collecting their results, synthesizing the information, and constructing a laboratory report. All reports should be well written, organized, typed, stapled and contain a title block. At laboratory time, the instructor will provide additional information on formatting and due dates.
- **Homework Assignments:** Topics' homework will be assigned. These assignments will focus on the material that has just been covered in class. All homework should be submitted at the beginning of class on the due date specified. All homework should be well written, organized, stapled and contain a title block.
- **Small Group Exercises/In-Class Assignments:** Frequent in-lecture homework assignments and small group exercises will stress topics currently being covered. There will be no makeup for these missed assignments.
- **Exams:** The course has no written exam. There might be limited number of take home quiz in the form of homework assignments.
- **Project presentation and write-up:** In this course, every one or two students pick one project topic and get the approval from the instructor. They will present their completed project at the end of semester in power point. Besides this, they need to hand-in a 6-page double column IEEE formatted report.
- **Brightspace:** The student is responsible to check Brightspace and PFW email on a regular basis for homework assignments, updates or any change related to class time and class assignment. If a student is not using the PFW email account, it is the student responsibility to forward their PFW email to another personal email account.

## 5. Grading

- **General:** The student is responsible for the completion of all required work in the course by the time of the last scheduled class meeting or other deadline set by the instructor, unless they have officially withdrawn from the course, or unless they and the instructor have agreed that a grade of Incomplete (I) is warranted.
- **Homework Assignments:** Homework will be assigned in lecture time. The assignments are expected to be turned in when they are due. Any assignment (or lab) turned in late will be graded as if it were turned in on time and then the grade will be reduced by at least one letter grade, depending on how late the material is. If the material is very late (**more than one week**), there will be no credit and no grade given.
- **Tests and quiz:** This course has no tests or quiz.  
**Term Project:** There will also be a term project given at the end of the semester during the finals week.
- **Student Behavior:** Students are expected to act in class as outlined in the Student Handbook. They are expected to be in class on time, be attentive in class, turn off all cell phones during class, and refrain from extraneous conversations between students except where designated by the instructor.
- **Grad forming parts:**
  - HW Assignments 30%
  - Labs activities 40%
  - Final project: presentation and write-up 30%

## 6. ECET 49900 / CPET 59100 Course Outcomes:

A student who well fulfills the course requirements will have demonstrated the ability to:

1. Understand the principles of digital communications (ETAC/ABET, Criterion 3 item 1)
2. Recognize digital modulations (ETAC/ABET, Criterion 3 item 1)
3. Be able to analyze link budget (ETAC/ABET, Criterion 3 item 1 & 4)
4. Build or simulate digital communications circuits (ETAC/ABET, Criterion 3 item 1, 2, 3, 4)
5. Be able to analyze line code attributes (ETAC/ABET, Criterion 3 item 1)
6. Become familiar with communication protocols (ETAC/ABET, Criterion 3 item 1)
7. Build and test a some forms of narrow-band wireless communication systems (ETAC/ABET, Criterion 3 item 1, 2, 3, 4)
8. Setup the basic forms of software defined radio communication systems (ETAC/ABET, Criterion 3 item 1, 2, 3, 4)

### ABET/TAC Criteria for Accrediting Engineering Technology Program's Student Outcomes

- a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;
- b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
- c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

- d. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
- e. an ability to function effectively as a member or leader on a technical team;
- f. an ability to identify, analyze, and solve broadly-defined engineering technology problems;
- g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- h. an understanding of the need for and an ability to engage in self-directed continuing professional development;
- i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
- j. a knowledge of the impact of engineering technology solutions in a societal and global context;
- k. a commitment to quality, timeliness, and continuous improvement.

## 7. General Information

- **Electronic Devices:** Students need to silence their cellphones and they are not allowed to use laptops in the class. Taking notes by hand will help students to increase their engagement and to improve their performance.  
University computer resources are designed to be used in connection with legitimate, university-related purposes. The use of university computing resources to disseminate obscene, pornographic, or libelous materials; to threaten or harass others; or otherwise to engage in activities forbidden by the Code is subject to disciplinary action.
- **Late Homework:** Assignments are to be handed in at the beginning of class on the due date specified. Work handed in late will be subject to an automatic grade reduction. Late work will not be accepted beyond one week after the specified due date. Failure to hand in homework will result in a zero for that assignment. Laboratory due dates and procedures will be at the discretion of the laboratory instructor.
- **Academic Honesty:** Academic honesty is expected of all students. You are responsible for knowing how to maintain academic honesty and for abstaining from cheating, the appearance of cheating, and permitting or assisting in another's cheating.
  - **Cheating** — intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term "academic exercise" includes all forms of work submitted for credit or hours.
  - **Fabrication** — intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
  - **Facilitating academic dishonesty** — intentionally or knowingly helping or attempting to help another in committing dishonest acts.
  - **Plagiarism** — the adoption or reproduction of ideas or statements of another person as one's own without acknowledgment.
- **Attendance:** You are expected to attend every meeting of the classes and labs in which you are registered. Anyone with more than two unexcused absences will have their grade reduced. Employment reasons, in themselves, are not an excuse. Work related absences need to be discussed with the instructor. It is the responsibility of the student to obtain and make-up any missed course material.
- **Course Assistance:** The instructor has an open door policy. If you have questions or concerns about anything pertaining to your education here at PFW please come see me.

There are a number of resources that you can be put in contact with that could help. Anything we can do to help enhance your education in turn enhances us.

- **Courteousness:** A fun, yet professional, atmosphere will be kept within the classroom. All cell phones, pagers and other multimedia devices should be turned off or changed to vibrate during class. Text messaging during class and lab is prohibited. Computers located in the classroom, or your laptop, should only to be used for course oriented material. The use of computers during lecture, unless otherwise specified, is prohibited unless taking notes. Lecture time should be on the focus of classroom material and not outside activities.
- **Tips for Success**
  - **Ask questions** about the subject matter when you do not understand.
  - **Ask questions** about the subject matter or any other issues you might be having with your education.
  - **Do not get behind** and if you do strive to catch back up. The class can seem to travel at an extensive speed so set aside time each day to study.
  - **Strive to learn the circuit wiring techniques in the laboratory.** These are skills you will use throughout your career here at PFW and beyond.
  - **This is foundational material.** Information you learn in this course will be used in all of your future CPET/ECET courses and is foundational. For IT majors, this will be your only electrical class but the course concepts relate to many of your other courses.
  - **Doing the reading assigned** for each class before coming to class is necessary to benefit from what we cover in class. The Tentative Course Schedule indicates the dates by which reading assignments should be completed before class.
  - **Communication in the course is essential.** If you don't understand material, are struggling with assignments, cannot make it to class, or have any other issues please EMAIL, call, or go see the instructor. It is not necessarily apparent to the instructor that you might be having issues.
  - **You are not being asked to accept ideas uncritically.** On the contrary, it is essential that you challenge ideas with which you disagree or about which you are skeptical. You also should be able to support ideas with which you agree using appropriate evidence (i.e., not just "I agree"; why do you agree?). Thus, critical thinking about the reading (as well as movies you will see as part of the course, what goes on in class, and assignments) is important. Ask yourself such questions as: Do I "buy" the idea? Does the concept or procedure make sense? Why? What is the evidence for or against an idea? What limitations does the idea have? What are my views on an issue and what leads me to think that way? These are just a few of the questions that stimulate critical thinking.
- **Communication**
  - I will be contacting you periodically between classes which will be done via email. One of the requirements for the course is that you maintain a PFW email address and check it regularly for messages. You are responsible for any messages, including assignments and schedule changes, I send you via email. If you don't check PFW EMAIL, then have it forwarded to an EMAIL address you check frequently.
  - The class schedule/syllabus will be available through Brightspace. Any changes, updates or postings will be on Brightspace.
  - The best time to contact me is during my office hours by visiting or calling. In addition to my office phone, you can call the department at leaving a messages with the administrative assistant. My PFW EMAIL is also checked frequently. I will generally get back to you within a day.

- **Military Service**

If you are a student in the military with the potential of being called to military service and /or training during the course of the semester, you are encouraged to contact your advisor immediately and instructor immediately. We appreciate and thank you for your service.

- **Expectations of the Instructor**

It is my responsibility to create a positive learning environment that will allow the student to master the material and discover how it relates to the larger picture of their education and future career. I also have the responsibility of keeping a controlled organized learning environment and providing timely response to student questions. I have available office hours set aside for you to visit and call.

## 8. PFW Services for Students:

**DISABILITIES STATEMENT/Special Needs:** If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (Walb, room 113, telephone number 481-6658), as soon as possible to work out the details. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to me. For more information, please visit the web site for SSD at <http://www.pfw.edu/ssd/>

**Ground Rules:** Adherence to the Student Conduct Code is expected. This class is based on learning that each person has a unique perspective and viewpoint to share and the contributions that each person makes will help create a learning opportunity for the class. Disagreements may occur, but please use cooperation in maintaining an atmosphere of mutual respect in postings. Hateful, demeaning, and disrespect, including foul language will not be tolerated.

**Diversity and nondiscrimination:** Statement from the PFW Student Handbook: "PFW is committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the university seeks to develop and nurture diversity. The university believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. PFW prohibits discrimination against any member of the university community on the basis of race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability, or status as a disabled or Vietnam-era veteran."

**Students called for military duty:** "If you are a student in the military with the potential of being called to military service and /or training during the course of the semester, you are encouraged to contact your advisor immediately."

### **Resource services for students:**

**Center for Academic Support and Advancement:** [www.pfw.edu/casa](http://www.pfw.edu/casa)

*The place to go for concentrated study time!*

**The SPOT Learning Center** (Kettler G21, 260-481-5419) offers free tutoring, day and evening, for many courses. Students are allowed up to two free hours of a one-to-one

tutoring per week per subject. Appointments for one-to-one tutoring must be made a day in advance through the online scheduling program TutorTrac at [www.pfw.edu/casa](http://www.pfw.edu/casa). Drop-in tutoring is offered for math and some science classes, and drop-in sessions allow the students to “stop by” and have a question answered.

**The Writing Center** (Kettler G19, 260-481-5740) serves faculty, staff, and students with any university-related writing project in any discipline. The center’s mission is to help all writers produce clear writing appropriate to their audiences. Knowledgeable consultants brainstorm, focus, organize, and develop their ideas as well as learn how to better cite sources and revise and proofread their own drafts.

**Information Technology Services Help Desk:** KT 206, 481-6030, [www.pfw.edu/offices/its/](http://www.pfw.edu/offices/its/) information on all aspects of computing at PFW; hardware and software support (including Brightspace); student e-mail accounts.

**Center for Women and Returning Adults:** Walb 120, 481-6029, [www.pfw.edu/cwra/](http://www.pfw.edu/cwra/), workshops, support groups, counseling, and other programs.

**Multicultural Services:** Walb 118, 481-6921, <http://www.pfw.edu/odma/>, skills workshops, support groups, diversity training, counseling, mentoring, cultural heritage programs; ASAP program.

**International Student Services:** KT 104, 481-6034 or 6923, <http://www.pfw.edu/iss/>, visa and INS issues; help with housing, counseling.

**Mastodon Advising Center (MAC):** KT 109, 481-6595, <http://www.pfw.edu/mac/>, appointments with professional academic advisors; help with guiding students in deciding on their major and ultimately their career; help for exploring students, deciding students, and readmitted students; and various student resources.

**Helmke Library Service Desk:** 481-6505, <http://library.pfw.edu>, reference librarian help, books, journals, reference, and interlibrary loan reserve readings for courses: Reserves Express (REX): [library.pfw.edu/about/reserves.html](http://library.pfw.edu/about/reserves.html).

**Dean of Students office:** Walb 111, 481-6601, [www.pfw.edu/dean/](http://www.pfw.edu/dean/), student health insurance, mentoring, grade appeals; free short-term personal counseling and support.

**PFW/PARKVIEW Student Assistance Program:** PFW recognizes that personal problems can sometimes interfere with a student’s ability to progress in his/her academic program. To help students address such problems PFW makes free personal counseling services available in Walb 210. To schedule an appointment with a PFW/PARKVIEW Student Assistance Program (SAP) counselor call 373-8060. <https://www.pfw.edu/counseling/>

## 9. Civility /Ground Rules for Discussion / Special Needs / Nondiscrimination

- Turn off beepers and cell phones during class.
- **Code of Student Rights, Responsibilities, and Conduct:** *The student and instructor should adhere to the code of student rights, responsibilities and conduct. These can be found in the <https://www.pfw.edu/handbook/>.*

- *My commitment is to create a climate for learning characterized by respect for each other and the contributions each person makes to the online class. I ask that you make a similar commitment.*
- Each person in this course has unique prior experiences and a unique viewpoint to share. This offers a great opportunity for us to learn from each other. Though disagreement and even conflict may occur, I expect your cooperation in maintaining an atmosphere of mutual respect. When participating in discussions, it is perfectly acceptable to have strong opinions – in fact I encourage you to do so. I also encourage you to discuss your own personal experience and relate it to that of others. In the process, however, I expect you to respect the basic intelligence and humanity of each participant in the discussion. Conflict is not necessarily a bad thing, as long as there is a commitment to mutual respect. Hateful and demeaning speech will not be tolerated.

**Tentative Schedule for ECET 49900**

---

Week	Topic	Activity
<b>Week #1</b>	<b>Fundamentals</b> (ADCs, Digital RF modulations, Multiplexing, Multiple access technologies, CDMA, OFDM, MIMO, 1G-4G cellular)	Lectures & Labs
<b>Week #2</b>		
<b>Week #3</b>		
<b>Week #4</b>		
<b>Week #5</b>	Emerging Cellular Communications Technologies (5G & beyond)	Lecture & Research
<b>Week #6</b>		
<b>Week #7</b>	Software Defined Radio	Lectures & Labs
<b>Week #8</b>		
<b>Week #9</b>	Spring Break	
<b>Week #10</b>	Communication Technologies for Internet of Things	Lectures & Labs
<b>Week #11</b>		
<b>Week #12</b>	Emerging WiFi Communications Technologies	Lecture & Research
<b>Week #13</b>	Connected Cars' Communications	Lecture & Research
<b>Week #14</b>	Industrial Communication Technologies	Lectures & Labs
<b>Week #15</b>		
<b>Week #16</b>	Project Presentations	